



# Alternative Assessment of Oral Health Disparities

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## What can be gained?

- **Traditional approach with surveys**
  - Prevalence estimates
  - Risk estimates
  - No attributable risk
- **Alternative/additional approach**
  - Improved description of the inequality
  - Quantification of the inequality



## Mean DMFT and the SiC

- **Mean DMFT**
  - Average number of carious teeth
- **Significant Caries Index (SiC)**
  - WHO, goal of 3.0 teeth
  - Mean DMFT of bottom one-third
  - <http://www.whocollab.od.mah.se/expl/siccalculation.xls>



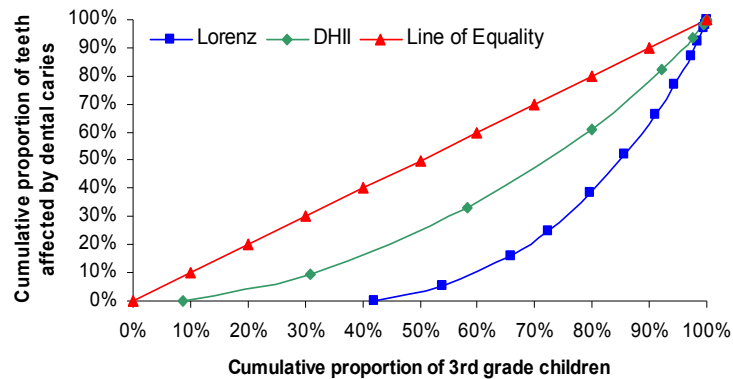
## The Lorenz Curve

- **Plot of cumulative proportion of disease versus cumulative proportion of population**
- **Leads to statements such as...**
  - 28% of Michigan children bear 75% of the caries burden
  - 13% of Michigan children bear 80% of untreated decay



## “THE SINKING SHIP OF INEQUALITY”

Inequality in the burden of dental caries among 3rd grade Michigan children, Count Your Smiles 2005-06



## Calculating Gini and DHII

- **Gini coefficient**
  - Proportion of area between the line of equality and the Lorenz curve out of the area under the line of equality
  - Calculus flashback...sum the trapezoids!
  - Limitation – based on continuous distribution
- **Dental Health Inequality Index (DHII)**
  - Same principle as Gini
  - Transform the line of equality for count data



## Transforming the Line of Equality

- **P(tooth had caries)**
  - Number of carious teeth
  - Number of examined teeth
- **P(child had DMF = X)**
  - Calculate the proportion of persons that should have X number of carious teeth
- **Plot the new distribution and calculate DHII**
  - Once again, fun with summing trapezoids
  - Proportion of area between the new line of equality and the Lorenz curve out of area under line of equality



## Caries Inequality in Michigan, 2005-06

Region	Caries Experience (%)	Mean DMFT (Teeth)	SiC Index (Teeth)	DHII	Proportion with 80% of caries burden
Upper Peninsula	70%	3.16	6.93	0.334	38%
Northern Lower Peninsula	66%	3.09	7.06	0.391	37%
Southern Lower Peninsula	62%	2.41	5.75	0.389	33%
Suburban Detroit	48%	1.61	4.34	0.492	26%
Detroit	63%	2.35	5.37	0.345	38%
Michigan	58%	2.20	5.47	0.438	32%



## Public Health Implications

- **Population-based versus targeted public health approaches**
- **Reducing disease or reducing disparities?**
- **Monitor inequality changes over time to help evaluate programs**



## References

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- Lee W. Characterizing exposure-disease association in human populations using the Lorenz curve and Gini index. *Statistics in Medicine*. 1997; 16: 729-39.